

Flight Scientist Report
Thursday 5/20/2021 ACTIVATE RF69

Flight Type: Statistical Survey Flight
Flight Route: KLF1 ATLIC ZIBUT 37/-71 35.75/-69.75 37/-71 ZIBUT ATLIC KLF1
Special Notes: Evidence of smoke aloft

King Air

Pilot report (Wusk):
Take-off 1458 Z

Landing 1844Z

3.8 hours

One flight day. 2-ship cooperative flight with the HU-25; routing ATLIC-ZIBUT-3700N07100W 3545N06945W-3700N07100W-ZIBUT-ATLIC, FL280. HU25 was held up some at takeoff due to ATC, consequently trailed UC most of the way out. UC12 slowed as much as possible but is limited in speed range. UC was held at FL250 for a portion of AR9 transit due to traffic. Still decent coincidence between aircraft for the flight. Had to commence descent out of FL280 approximately 40nm east of ATLIC on return to field due to ATC constraints, having to cross ATLIC at 12,000'. Winds at altitude from the north ~ 30 kts; Some haze and smoke at higher altitudes and what appeared to be rough surface conditions at sea level.

Crew was Jamison, Wusk, and Shingler. Aircraft was nominal and should be ready for next mission

Flight scientist report (Shingler):

The climb out of KLF1 towards ATLIC-ZIBUT was very hazy. Lidar data showed multiple layers with possible dust/smoke forming in layers at various altitudes between about 8-25kft (our flight altitude). UC12 was constrained to 25kft until ZIBUT due to military ops above. Starting a few minutes before ZIBUT, the MBL started to form and increased from the surface to about 2000' for the next 20 minutes or so. Changes in depolarization within the boundary layer were seen throughout this time. The boundary layer continued to rise all the way out to the end of the track (up to approx 5000'). Shallow cu developed along the track with bases/tops between 2-5kft. Some enhanced depolarization pockets were seen below the cloud deck near the surface. The return trip was very similar to what we saw on the way out. 4 sondes were dropped according to the plan (ZIBUT on the way out, turn point, mid point (the bend), and nearest to the coast). The last sonde was dropped before ATLIC as we were ordered down by ATC to 12kft before ATLIC. There are many interesting layers to look at between ZIBUT and the coast (but above the Falcon's profiling range).

Falcon

Pilot report (Baxley): Science flight for the HU-25 in support of ACTIVATE, conducted cooperatively with the UC-12. Departed Rwy08 to ATLIC climbing to 3k ft MSL for initial transit. Research profiles conducted from ATLIC-ZIBUT-N3700/W07100-N3545/06945W-N3700N/W07100-ZIBUT-ATLIC, from 500' to 5500' MSL. Winds were moderate (<30 knots), with clear air until east of ZIBUT and then a scattered layer from 2500' – 5000' MSL between ZIBUT and the eastern most point. Both cloud and clear air modules were completed throughout the flight as conditions warranted. Aircraft geolocation was within ~20 nmi throughout the flight, and generally within ~10 nmi during the return westbound leg. All objectives were achieved and no system discrepancies were noted.

Pilots: Baxley/Thorson

QNCs: Crosbie/Winstead

Time: 1110 takeoff, 1428 land, 3.3 hrs

Flight scientist report (Crosbie): Initial profile up to 8000 ft to examine enhanced aerosols. The enhanced aerosol was reported to extend higher by the UC12 and the concentrations did not return to background levels at 8000ft. Clear sampling to just past ZIBUT. The MBL was initially very shallow and then started to build in up until where the clouds started. Cloud conditions were very favorably, with well-defined bases and tops capped at around 5000ft, no observed precip. Similar conditions were observed on the onbound leg and once the MBL was too low to sample (<500ft) we repositioned to 4000 to sample an elevated aerosol layer. (2 full cloudy, 5 clear)

From Eddie:

During climb out, scattering peaked at ~50; some increased absorption.

15:32:50 - @3800 ft, scattering = 35

15:36 – Broad LAS distribution

15:38:44 @33Kft, scattering = 18

15:40:30 – Scattering decreasing at constant altitude

15:45 – Aerosol conc variability

15:50 - @500 ft, conc stable, but scattering increasing

15:56 - @3000 ft, conc & scattering stable; Near end of leg, conc & scattering decreasing

16:00 - @1200 ft scattering down to ~10; conc decreased

16:01 – MBL @ ~1200 ft

16:09 – Whitecaps; wind = ~27 kts

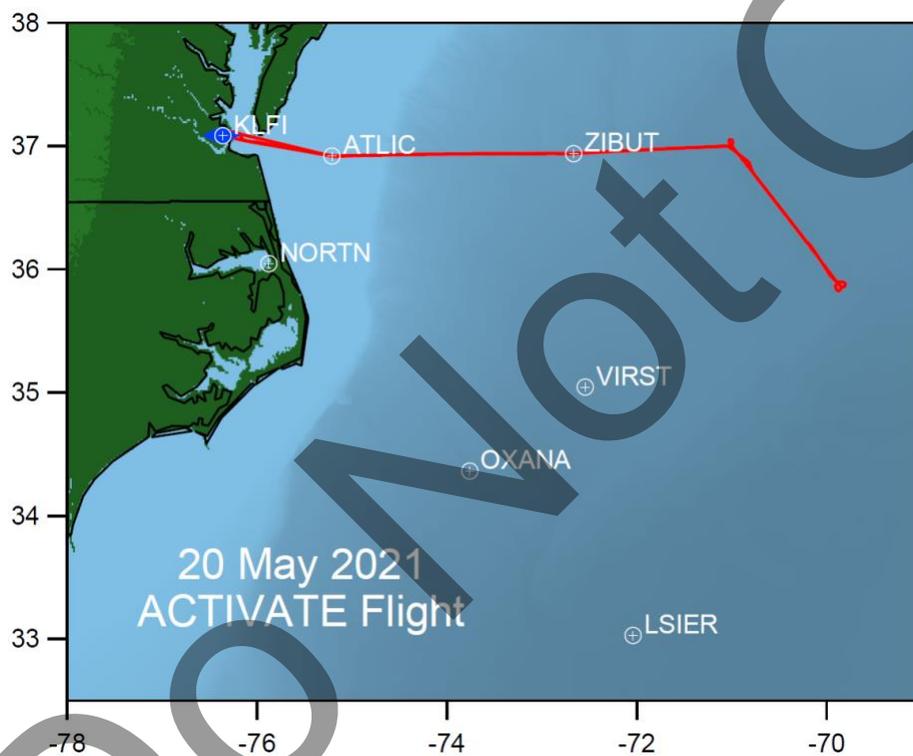
16:29 – Cloud bases increasing

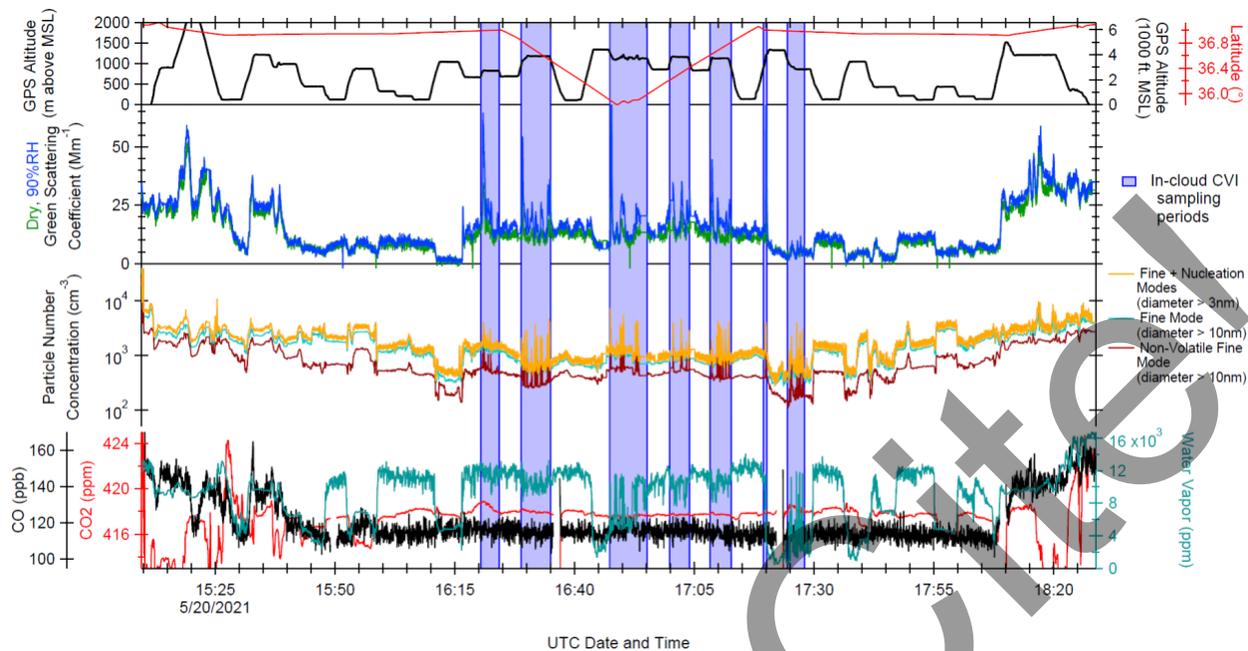
17:00 – Maybe 15 to 20 ft ocean waves

18:09:25 – Enhanced aerosol layer between 4 to 5 Kft; scattering = ~25

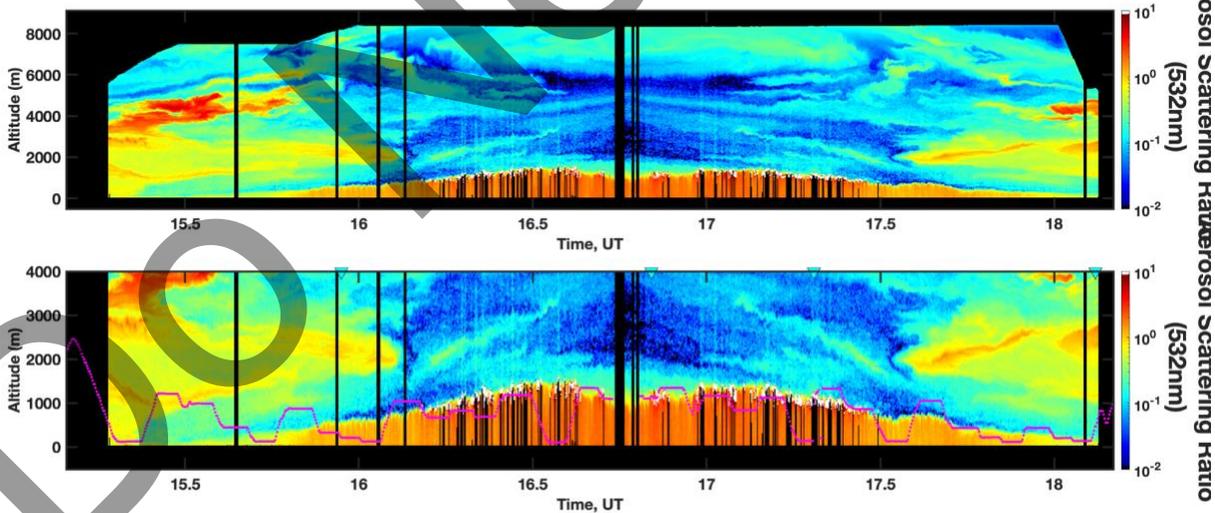
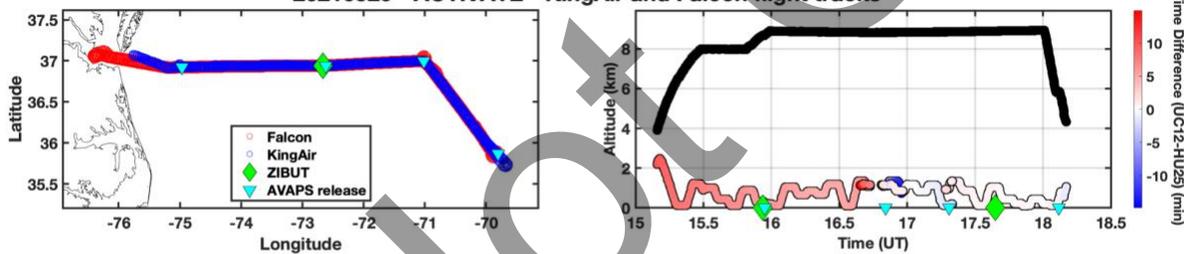
18:17 – Scattering = ~50; Coastline in sight

18:20 – Humidifier & WCM turned off





20210520 - ACTIVATE - KingAir and Falcon flight tracks



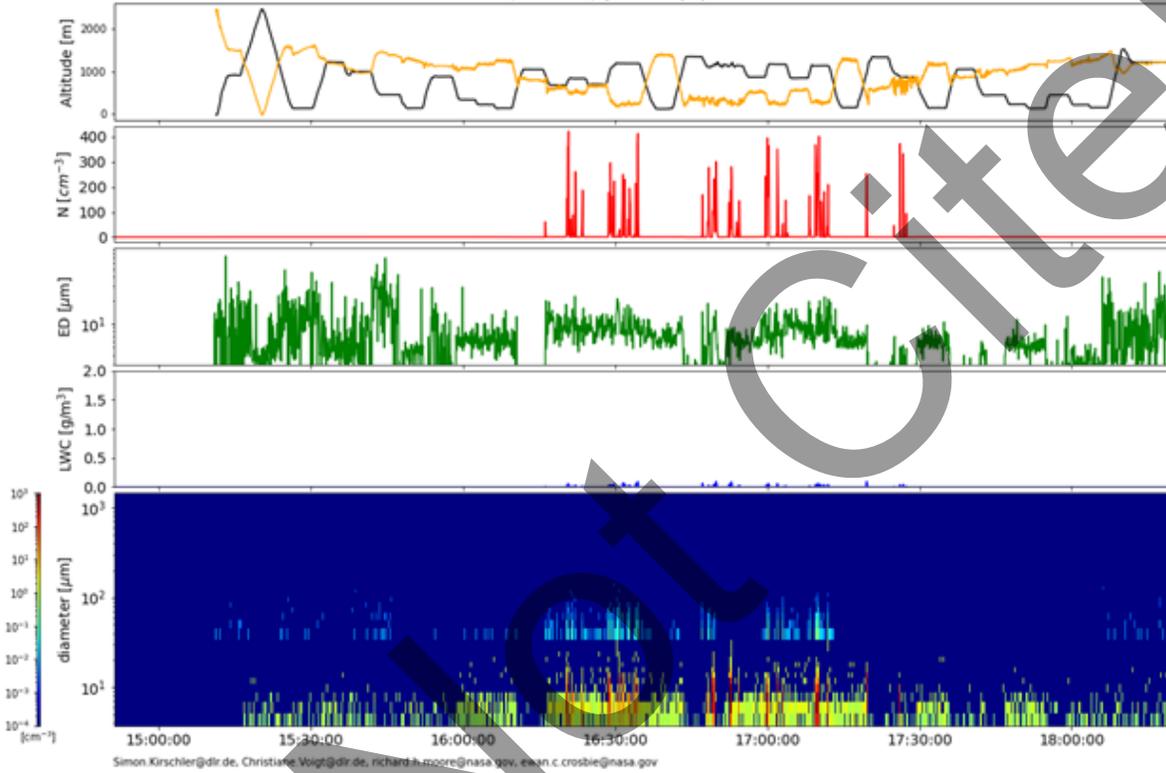
Quicklook ACTIVATE Cloud Probes (FCDP & 2DS) Quicklook

preliminary data, only for quicklook use

Simon Kirschler, Christiane Voigt, Richard Moore, Ewan Crosbie



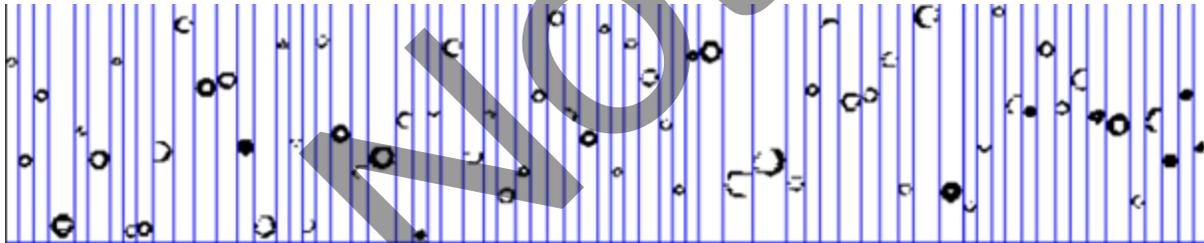
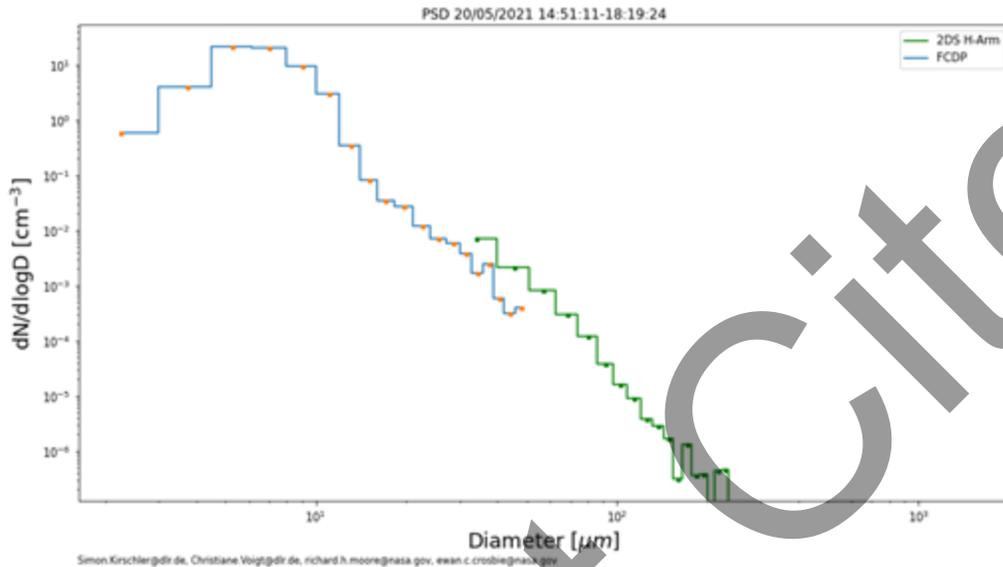
Cloud Probes (FCDP & 2DS) Quicklook 20/05/2021 14:51:11-18:19:24



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PSD ACTIVATE

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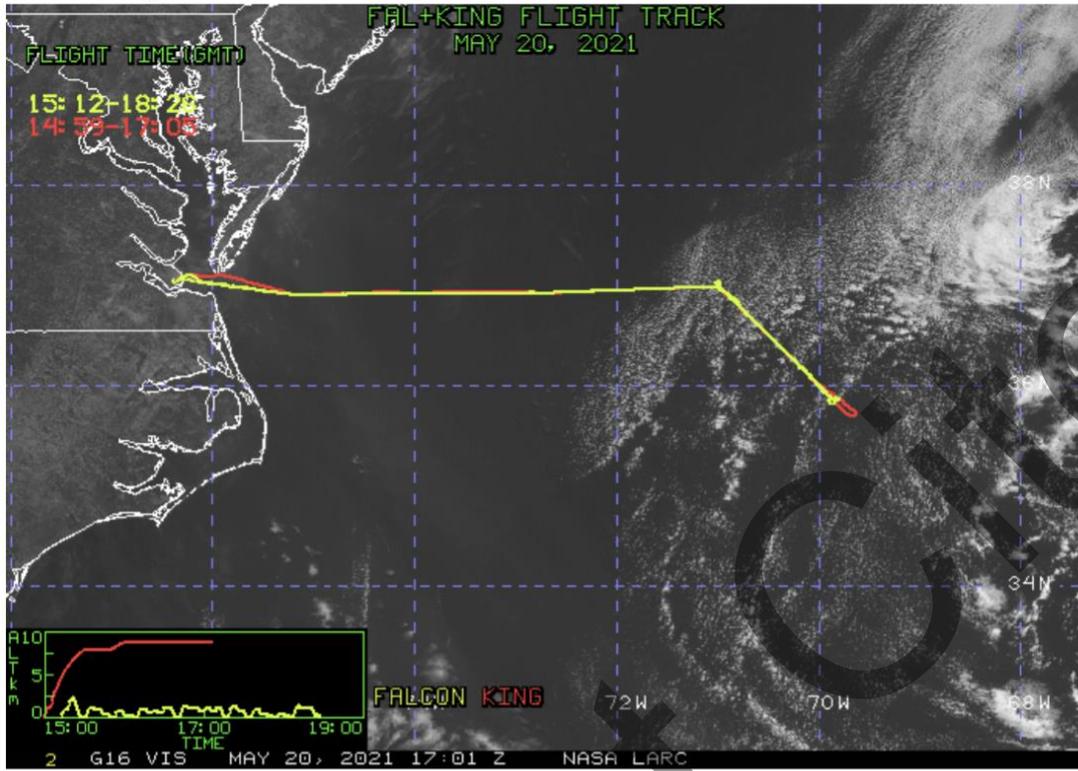


Pure liquid clouds.

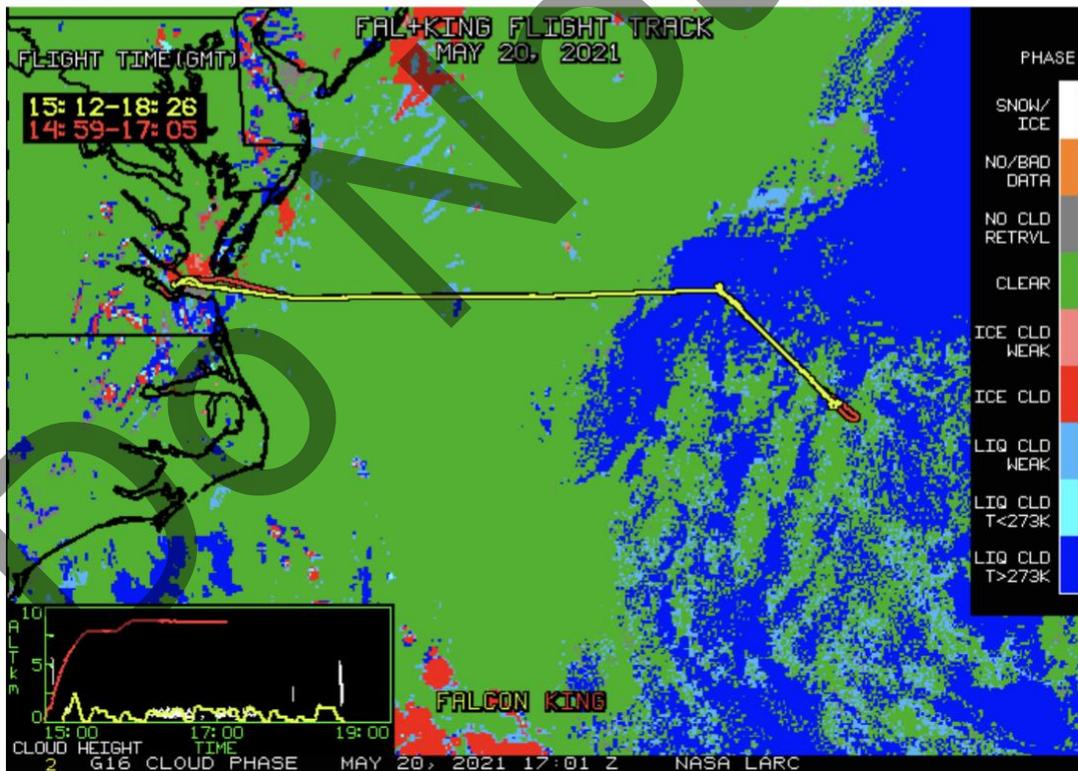
NASA-LaRC Clouds Group GOES-16 Quicklook Images for Flight 69, 17:01 UTC May 20, 2021

Do Not Cite!

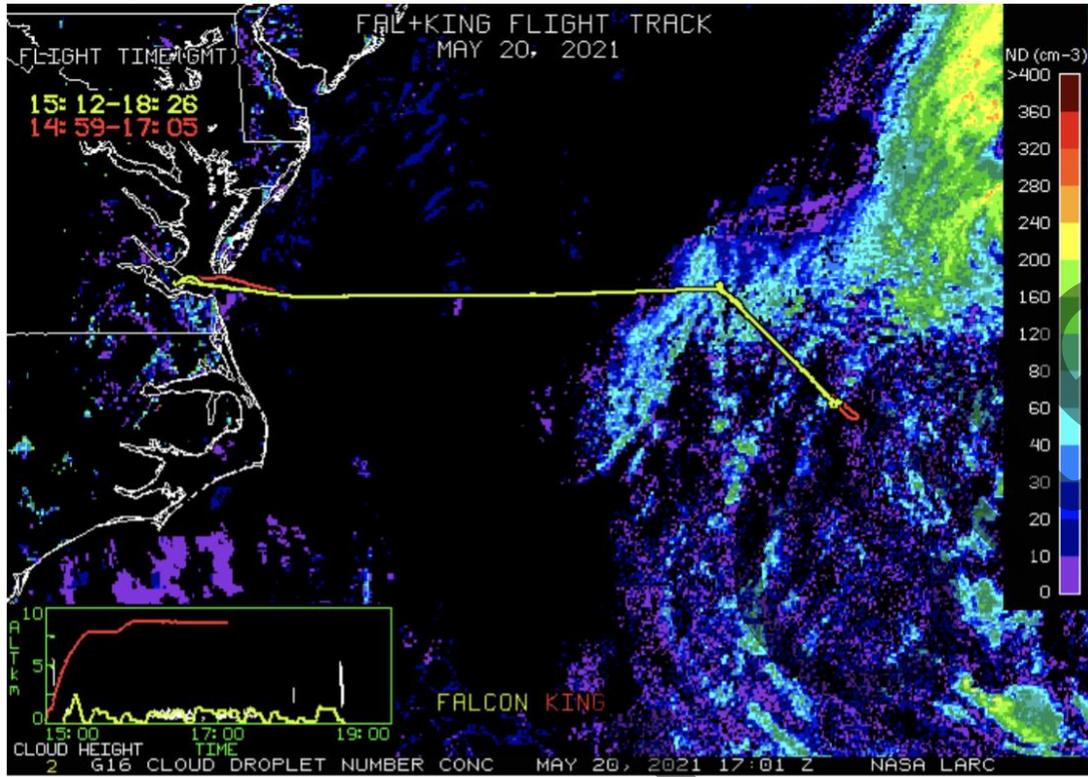
Visible Image



Cloud Phase



Cloud Droplet Number Concentration (cm-3)



Cloud-Top Height (Kft-ASL)

